Title: The Great Pumpkin Adventure

Brief Overview:

Each cooperative group will use mathematical knowledge to formulate clues which will require another group to use computation skills, collect data, analyze, and solve real-life problems.

Link to Standards:

- **Problem Solving** Students will demonstrate their ability to solve problems in mathematics including problems with open-ended answers and problems which are solved in a cooperative atmosphere.
- **Communication** Students will demonstrate their ability to communicate mathematically. They will read, write, and discuss mathematics with language and the signs, symbols, and terms of the discipline.
- **Reasoning** Students will demonstrate their ability to reason mathematically. They will make conjectures, gather evidence, and build arguments.
- **Connections** Students will demonstrate their ability to connect geometric concepts to architecture in the real-world.
- **Number Relationships** Students will demonstrate their ability to describe and apply number relationships using concrete and abstract materials. They will choose operations and describe effects of operations on numbers.
- **Estimation & Computation** Students will demonstrate their ability to apply estimation strategies in computation with the use of technology in measurement and in problem solving. They will determine reasonableness of solutions.
- **Geometry & Spatial Sense** Students will demonstrate their ability to describe and apply geometric relationships using one, two, and three-dimensional objects.
- **Measurement** Students will demonstrate and apply concepts of measurement using standard units and customary units. They will estimate and verify measurements. They will apply measurement to real-world problem-solving situations.
- **Probability & Statistics** Students will formulate and solve problems that involve collecting and analyzing data and explore concepts of chance.

- **Patterns & Relationships** — Students will demonstrate their ability to recognize numeric and geometric relationships and will generalize a relationship from data.

Grade/Level:

Grades 3-5

Duration/Length:

This activity should take 4-5 days of 45-minute sessions.

Prerequisite Knowledge:

Students should have working knowledge of grade appropriate math concepts.

Objectives:

Students will:

- work cooperatively in groups.
- collect and organize data.
- estimate and measure distance.
- perform number computations.
- justify answers using data, mathematical reason, and value judgements.
- communicate mathematically using oral and written language.
- relate mathematics to real-world situations.
- evaluate self and others within cooperative learning groups.

Materials/Resources/Printed Materials:

- Pumpkins
- Pencils & paper
- Calculator
- Rulers & yardsticks
- Envelopes
- Manipulatives for solving clues

Performance Assessment -- Development/Procedures:

Task 1:

- Discuss the mystery of the missing pumpkins from the school harvest display.
- Divide the students into equal groups.
- Distribute to each group an envelope containing the location of a missing pumpkin. Examples: P.E. equipment closet, blue wing closet under the sink in art room.
- Tell students to be secretive about the contents of the envelope and instruct them to begin formulating mathematical clues that will lead another group to the pumpkin. Clue Guidelines: six to ten clues; all of the following math concepts should be included:
  multiplication, division, addition, subtraction, measurement, estimation, geometry. These concepts should be included through use of other than base ten units, tangrams, geoboards, palindromes, patterns, sorting, and power blocks.
- Formulate the clues. For examples, see Teacher Resource 1.

Task 2:

- Distribute clues in a sealed envelope to a group other than the one that wrote them.
- Direct them to open the envelope and solve the clues to find the missing pumpkin.
- Submit group questions regarding clarification of the clues in writing. Place them in the appropriate group envelope.

Task 3:

- Have each group explain how they solved the clues and found the pumpkin.

Evaluation:

- The teacher observes cooperative group interaction and individual participation.
- Each group must successfully complete the task (find the pumpkin using the clues).
- Each group member completes a cooperative group evaluation sheet (see Teacher Resource 2).
- The teacher evaluates using a summative assessment based on group oral presentation of process solutions.

Extension/Follow Up:

- Estimate weight and circumference of the pumpkins.
- Measure exact weight and circumference.
- Estimate the number of seeds.
- Count the actual number of seeds.
- Make pumpkin bread (see Teacher Resource 3 for a recipe).

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Sample Clues

Example Clue 1

Using base five, find the sum.

$$\begin{array}{r} 23 \\ +\ 14 \\ \hline \end{array}$$

Measure the sum of the base five addition problem in feet from the classroom door facing left going toward the office. Look for the equilateral three-sided figure for your next clue.

Example Clue 2

2, 4, 8, 16, ___, 64, 128
4, 8, 12, 16, 20, 24, 28, ___, 36, 40

Complete the pattern to find the room location of the next clue.

Example Clue 3

Put the tangram pieces together to make a three-sided figure. When you are finished, show it to your teacher. Then make a four-sided figure. Show it to your teacher and get your next clue.

Example Clue 4

Go to the smallest even-numbered room. They will have a box of blocks for you. Sort the blocks by color (or shape). Count the number in each group. Find the highest number. This is the number of the room where you'll find your next clue.

Sample Group Evaluation

Check the box that best describes your cooperative group during the activity.

A = always S = sometimes N = never

Participation			
Cooperation			
Sharing			
Individual Effort			

Comments:

NUTTY PUMPKIN BREAD

Ingredients:

1 cup brown sugar	2 tsp. baking powder
1/3 cup shortening	½ tsp. salt
2 eggs	½ tsp. ground ginger
1 cup canned pumpkin	1/4 tsp. baking soda
1/4 cup milk	1/4 tsp. ground cloves
2 cups all-purpose flour	½ cup chopped nuts

Directions:

1. Beat together brown sugar and shortening.
2. Add the eggs.
3. Add the canned pumpkin and milk. Mix.
4. Add the flour, baking powder, salt, ginger, baking soda, and cloves. Mix.
5. Add the nuts. Mix.
6. Put the batter into a greased 9x5x3 loaf pan.
7. Bake at 350 degrees for 55-60 minutes. Cool and slice.